



Herbert Spencer, 1861

## *Metallic Mining in Wisconsin:*

# **THE CRANDON MINE REVIEW**

**“THE IMPACTS OF THE CRANDON MINE ENVIRONMENTAL REVIEW PROJECT WILL BE FELT IN FOREST COUNTY AND ACROSS ALL OF NORTHERN WISCONSIN”, SAYS MELISSA DEVETTER.**

Melissa is the Science Services project manager working with staff from several bureaus in Madison and Rhinelander and directing the work of a large team of DNR technical specialists and external consultants coordinating the review of the proposed Crandon mine. This proposed mining project is perhaps the most controversial and technically complex proposal ever to come before the DNR.

Nicolet Minerals Company (formerly the Crandon Mining Company) initiated the permit process for the proposed mine in 1994. The mining company wants to extract approximately 55 million tons of ore, produce concentrates of zinc, copper, and lead, and sell the concentrates on the international market. The DNR is required by statute to review mining permit applications and prepare an environmental impact statement (EIS) on the proposed project. Waste Management is the lead bureau involved in reviewing information presented in Nicolet Minerals Company's mining permit application. In addition, there are also other bureaus involved in permit review and verification activities.

Before any permits can be issued, the DNR must complete the EIS process on the proposed project. The purpose of an EIS is to disclose predicted impacts (e.g. environmental, cultural, economic) should the project be allowed to happen. The EIS document describes in detail the mining proposal and the affected environment. It also presents an assessment of impacts to Wisconsin's resources, should the project be permitted, and evaluates alternatives to the proposed project. Science Services' Environmental Analysis and Liaison program is ultimately responsible for the coordination, compilation, and production of the required EIS. The DNR anticipates releasing the draft EIS on the Crandon mine for public review in 2003.

Under Wisconsin law, the applicant pays for all costs associated with the EIS process and review of the various permit applications. Nicolet Minerals Company has already reimbursed the state over six million dollars in review and verification work performed by the DNR and its consultants.

Two key issues that have been at the core of the technical evaluation are the potential impacts from the proposed Tailings Management Area (TMA) and the re-flooded mine. Tailings are what's left over from mining; the rock where gold, copper, silver and other minerals are found is ground up into

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Waste Management

Watershed Management

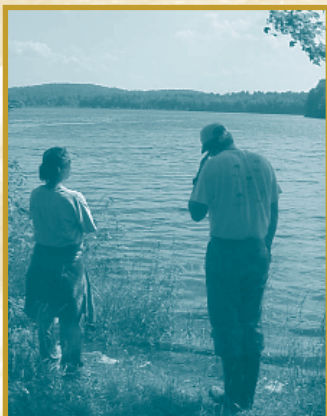
Fisheries Management and  
Habitat Protection

Drinking Water and  
Groundwater

Endangered Resources

Wildlife Management

Air Management







# m e t a l l i c   m i n i n g

fine particles so the valuable material can be taken out and refined. The NMC has proposed to take pyrite out of the tailings, mix it with cement, and then pump it underground into the mine. The company then proposes to flood the mine in order to prevent oxygen from mixing with the chemicals and forming acid.

If contaminants are present in the mine wastes that are stored or disposed of in these two facilities, those contaminants could, in the long term, migrate off site. As a result, some groups are concerned about possible leaching from the re-flooded mine into the groundwater. Among native tribes there is concern that the wild rice (which is sensitive to environmental changes) may be negatively affected by possible degradation of water quality. Under Wisconsin law, groundwater from the TMA and re-flooded mine must be able to comply with groundwater standards forever.

While some local groups in the area want the income and growth the mine would bring to the community, other local groups are concerned about changes to the landscape due to increased growth and buildings generated by the mine. Regardless of the outcome, the impact of the EIS and the subsequent decision regarding the permitting of the mine will be significant.

DNR staff and consultants have been monitoring and performing verification work in relation to various resources in order to establish baseline environmental conditions. This monitoring includes, but is not limited to, collecting air, surface water, and groundwater samples; measuring stream flows, sampling fish populations, and observing wildlife populations. DNR staff and consultants have also utilized various computer models to predict impacts to resources and assess compliance with environmental standards.

The DNR has determined minimum lake levels and stream flows that need to be maintained to prevent “unreasonable detriment” (as required by the mining law) for the water bodies in the project area. If drawdown caused by the mine pumping would affect a lake or stream by reducing its level or flow below the established threshold, the company would be required to add water to that body similar in quality to that of the original lake or stream.

DNR staff and consultants have put forth a monumental effort over the past nine years. The science and technology involved with both the EIS and the permit review process is very complex. An Administrative Law Judge will make decisions on all of the required permits and approvals of the final EIS at a Master Hearing. If it is determined that the proposed mining project will be able to meet the standards and requirement of applicable laws, it must be permitted. ●



# *Finding Out About* **TOXICS IN YOUR COMMUNITY**

**IN OCTOBER 1984, ACCIDENTAL EXPOSURE TO METHYL ISOCYANATE RESULTED IN THE DEATHS OF MORE THAN 2,000 PEOPLE AND ADVERSE HEALTH EFFECTS IN MORE THAN 170,000 SURVIVORS IN BHOPAL, INDIA.**

Not long after that, there was another serious chemical release at a plant in West Virginia. These incidents spurred increased demands by the public for information on the presence of toxic chemicals in communities. As a result, in 1986 Congress was prompted to enact the Emergency Planning and Community Right-to-Know Act (EPCRA), also known as Title III of the federal Superfund Amendments and Reauthorization Act. In 1988, the Hazardous Substances Information and Emergency Planning Act implemented the EPCRA in Wisconsin. The result is the Toxics Release Inventory (TRI), a program mandated by the U.S. Environmental Protection Agency (EPA).

The primary purpose of TRI is to provide information to the public about the presence and release of toxic chemicals in their communities. Wisconsin statute governs the TRI program by calling for all facilities and state and public agencies covered under federal regulations to comply with federal TRI program requirements. TRI facilities are required to report on- and off-site releases to the environment, off-site transfers, and pollution prevention and recycling activities related to their use of 650 listed toxic chemicals. A release is a discharge of a toxic chemical to the environment. On-site releases are reported by environmental media and include emissions to the air, discharges to bodies of water, releases to land, and releases into underground injection wells. Off-site releases are chemicals transferred off-site for treatment or disposal at another facility. TRI reports are submitted on or before July 1<sup>st</sup> each year to the EPA and DNR. DNR's inventory includes all information facilities are required to report to EPA plus data from all Wisconsin public or private agencies and facilities listed under Standard Industrial Classification (SIC) Code 10 (oil and gas extraction).

The TRI program maintains and makes available Wisconsin's release data, performs quality checks, and produces annual reports and analyses of TRI data for the Department and its customers. Tara Edblom, an environmental toxicologist and the coordinator of Wisconsin's TRI program, and Mike Solomon, the TRI program specialist, analyze the data, do quality checks for errors, compare the EPA data for Wisconsin to the DNR data, and write an annual report. The yearly public data release is the culmination of the year's work. Reports for both 2000 and 2001 data will be out in 2003. TRI data are available on the EPA web site at <http://www.epa.gov/tri/>, through

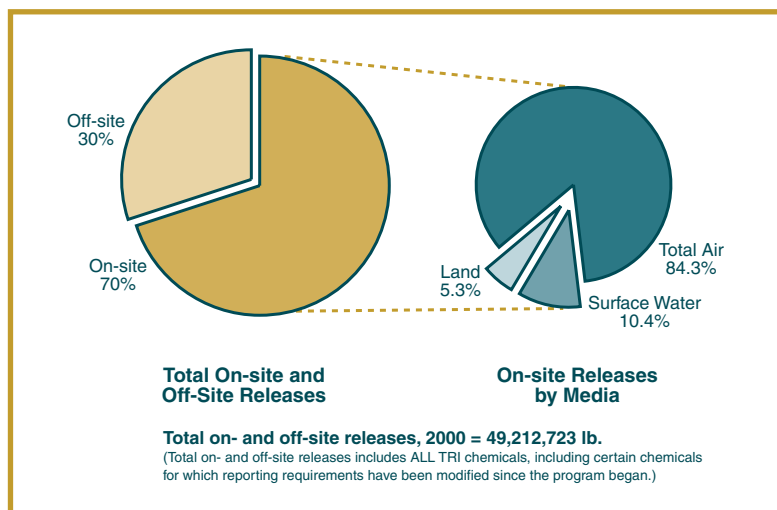
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Cooperative Environmental  
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Groundwater  
Watershed Management







# finding out about toxics



*TRI on- and off-site releases, including original and new industries in 2000.*

the DNR's FACT System ([http://prodmtin00.dnr.state.wi.us/pls/prod1/pk\\_esr\\_web.fact\\_home](http://prodmtin00.dnr.state.wi.us/pls/prod1/pk_esr_web.fact_home)), and through Tara or Mike.

A variety of groups use the TRI data for many different purposes. Citizens and community groups may use the data to educate themselves about the presence of toxic chemicals in their neighborhoods. Local, state, and federal governments may use the data to set priorities, measure progress, and help establish emergency response plans. Numerous facilities may use the data to set goals for release reductions, recycling, pollution prevention, and to analyze their efficiency. Public interest and environmental groups, news media, educators, researchers, students, and consultants are among other groups who may use TRI for information.

Since the inception of the TRI program, the DNR has seen an overall *decrease* in toxic releases from facilities in the state! The total on-site releases for the original manufacturing industries in the program have decreased by almost 57% between 1989 and 2000. Acknowledging the community's right to know and providing the opportunity to discover exactly what industries release into the environment appears to encourage facilities to reduce their toxic releases and become more efficient. The TRI program has given the public unprecedented direct access to toxic chemical release and other waste management data at the local, state, regional, and national levels. Ultimately this has contributed to a healthier environment for us all. ●



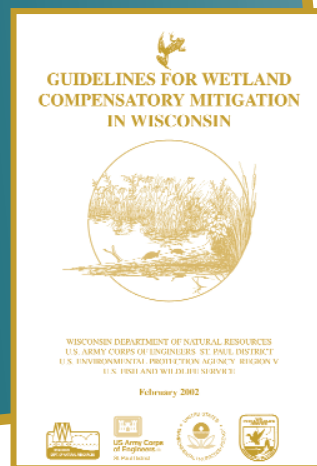
## Guiding the mitigation of wetland losses...

Wisconsin's compensatory wetland mitigation program establishes guidelines for required mitigation for permitted wetland losses in the state. These guidelines apply to agency personnel, mitigation bank sponsors, permit applicants, and others. The guidelines help customers meet the requirements of the federal Clean Water Act (including the USEPA 404(b)1 Guidelines and the November 1995 Federal Mitigation Banking Guidance), Rivers and Harbors Act, and state statutes and administrative codes pertaining to wetlands (NR 103, Wis. Admin. Code), and other applicable federal, state, and local statutes, regulations, guidelines, and ordinances.

Wisconsin Department of Transportation (DOT) projects continue to be reviewed in accordance with the DNR/DOT Cooperative Agreement and the DOT's *Wetland Mitigation*

*Banking Technical Guideline* dated July 1993 (as amended). The guidelines do not tell someone how to construct a wetland compensation site, but rather provide details on what information is needed before a compensation project may proceed. Enforcement authority associated with any compensatory mitigation follows the authority listed in the pertinent statute or law under which the permit, permit conditions, contract, or court order requiring compensatory mitigation are issued.

Science Services recently published a document titled *Guidelines for Wetland Compensatory Mitigation in Wisconsin* [PUB-SS-961 2002] to help aid customers and staff. In understanding the mitigation program. Information on how to obtain this publication can be found on the Science Services web site at: <http://www.dnr.state.wi.us/org/es/science/>.



**Toxicologists, like Tara L. Edblom (below), examine the effects of environmental contaminants on native wildlife species. Knowing the effects of contaminants helps environmental quality programs establish reasonable science-based discharge limits.**





## Evaluating walleye stocking...

Walleye supplemental stocking is a widely used management approach in Wisconsin that has not been rigorously evaluated. This is partly due to the fact that the traditional practice of clipping fins to mark fish is stressful to fingerling walleye and may lead to artificially low returns. Therefore, researchers use indirect measures of performance, such as comparing fall young-of-the-year (YOY) electrofishing catch rates in stocked and non-stocked years in individual lakes, to evaluate stocking success. In this 4-year study, Science Services staff Jeff Kampa, Martin Jennings, and Gene Hatzenbeler directly measured the contribution of stocked fish to the year class in mixed recruitment fisheries and compared catch rates in 23 stocked and non-stocked lakes.

For treaty fishery management purposes, the pool of study lakes was classified as mixed recruitment fisheries (a population comprised of natural reproducing and stocked fish). The study design included lakes that were selected with the assistance of Fisheries Management and Habitat Protection staff throughout the Northern Region and the Great Lakes Indian Fish and Wildlife Commission. Lakes were split into two groups and each group was stocked in alternate years. The otoliths (fish ear bones) of stocked fish were marked with a chemical (oxytetracycline) so the next time the population is randomly sampled, stocked fish will be easily identifiable. Stocked walleye ranged from 1 1/4 to 1 3/4 inches in length and were stocked at a density of 50 per acre. All lakes were sampled in the fall of each year by electrofishing the entire shoreline

of the lakes and all YOY walleye were collected. Otoliths, from a subsample of up to 100 fish collected in the fall, were examined for the chemical mark to determine the percent contribution of stocked fish to the year class.

The researchers used the Serns' Index to calculate the abundance of stocked fish and estimate the survival of stocked walleye by dividing the number of YOY present in the fall by the number of walleye fingerlings stocked in June. Catch-per-effort (CPE) was measured as the

number of fingerling per mile. They tested for differences in CPE between stocked and non-stocked years. The results indicated that there was a statistically significant difference in CPE between stocked and non-stocked years. The CPE was less than 10 fingerlings per mile for 76% of the stocking events and 0 fingerlings per mile for 41% of the stocking events. The mean percent survival of stocked fingerlings from June to the fall was 2.9%

(+/- 1.3%) which is consistent with results from other multi-lake studies.

In addition to comparing catch rates between stocked and non-stocked lakes and contribution to year class the researchers will try to identify physiochemical and biological characteristics of lakes that tended to have the greatest recruitment of stocked fish to fall. This information, coupled with the catch rate data should aid fish managers in reviewing current walleye stocking programs and help them make decisions on new stocking proposals to get the greatest return on resources put into the statewide walleye propagation program.



# Monitoring **BEACHES IS NO PICNIC**

**WHO WORKS TO KEEP WISCONSIN BEACHES SAFE FOR SWIMMERS?  
RON ARNESON, THE LABORATORY COORDINATOR IN SCIENCE SERVICES,  
CREDITS TONI GLYPH, A MICROBIOLOGIST IN THE BUREAU OF**

Watershed Management, Alison Matthias in the Bureau of Parks and Recreation, and Sharon Kluender with the State Lab of Hygiene. Ron is in charge of coordinating all of the laboratory services for a Beach Monitoring Project. The goal of this project is to monitor inland and Great Lakes (i.e. coastal) beaches for *Escherichia coli* (a.k.a. *E. coli*) in order to reduce human exposure to unhealthy levels of this bacterium. This project is a statewide endeavor since general funding (GPR) through the state laboratory of hygiene covers inland beaches and federal funding through the U.S. Environmental Protection Agency covers coastal beaches. In the summer of 2002, the cost for statewide beach monitoring was close to \$40,000.

Interestingly, over the years, beach monitoring efforts have been declining. A few years ago, DNR staff discovered that there were inconsistencies in the way beach monitoring data were collected between state parks. Some parks had even dropped beach monitoring altogether because they didn't have a designated beach with lifeguards! Increased beach closures in the Milwaukee area brought more attention to the issue. At that time a decision was made to monitor all state park beaches. State Parks Director Sue Black decided that "if people are swimming there, then we will monitor the beaches!" Although many beach closures occurred in 1999 (e.g., Milwaukee's South Shore Beach closed 34 times in 1999), consistent monitoring of beaches in state parks did not start until 2002. Consistent monitoring has led to an increase in beach closures or health advisories on some beaches (e.g., in 2002, all beaches in the Milwaukee area had at least 1 beach closing).

In mid-July 2002, a number of people complained of flu-like symptoms. The one thing they had in common was swimming at Nicolet Bay Beach in Peninsula State Park. So many people got sick that park staff members were concerned about cleaning the bathrooms that served these people for fear of getting sick themselves. If something like this could happen at Peninsula State Park (a park known for its pristine qualities) then it could happen anywhere. This health problem at Peninsula State Park was clearly a problem in the water. The source of this problem, however, has not been definitely determined. It could be waterfowl droppings, agricultural runoff, urban runoff, dog feces, or even point-source problems like toilets on boats, boat bilge, septic systems, sewage treatment plants, etc.

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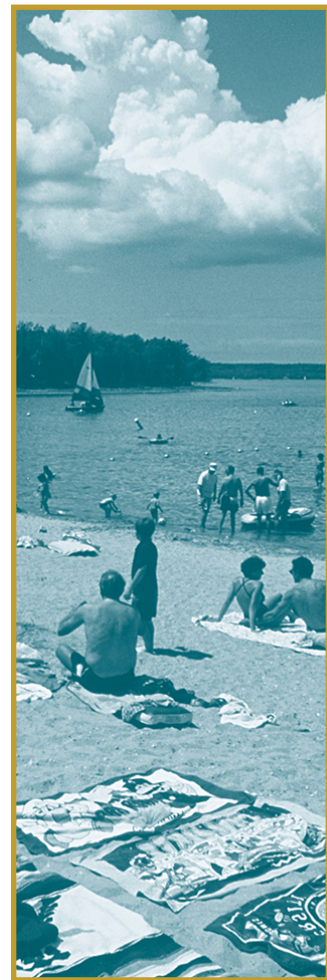
# monitoring beaches

Clearly, more research is needed to identify sources of pollution and to reduce beach closures; we need to limit whatever sources there may be. Currently, monitoring for public health protection is ongoing although vulnerable to budget cuts. A work group has been convened to review the policies and monitoring methods used by the DNR and local health officials.

As part of Science Services, Ron Arneson serves as the primary contact and takes daily phone calls during the beach season. Ron also maintains a database and provides much-needed beach monitoring data to DNR staff. He also procures funding for the laboratory analysis portion of the beach monitoring program. In the spring of 2002, Ron helped train property managers on how to best collect samples and obtain data. To collect data, one must wade knee-deep into the water, collect a water sample, cap the bottle, fill out the necessary paperwork to track the sample, and send the bottle of water to the State Lab of Hygiene for testing and analysis. The results are then e-mailed back to the park. If there are over 235 organisms per 100 milliliters of water, the beach is listed under a health advisory or closed. The beach cannot reopen until further tests determine that the water is safe.

The Beach Monitoring Project will have an impact on DNR policy decisions regarding frequency of monitoring, health advisories, and beach closures. The project also has an impact on whether or not permits are granted for point-source discharges. It has been suggested the DNR may use this project as a model to set up a similar monitoring program for *E. coli* in wastewater operations. Local monitoring efforts through counties and municipalities and on private beaches may also follow the example of this project.

In the short-term it may appear that consistent beach monitoring may result in increased health advisories and beach closures, thus reducing the recreational usability of the beaches. However, in the long run, a tighter monitoring system will actually increase usability of the beaches by identifying problems before they have a chance to affect the water. A better monitoring system will also protect public health by recognizing problems before they have a chance to negatively affect human health (e.g., at Peninsula State Park). In addition, monitoring increases awareness of the impact that human activities have on recreational surface waters. Through the Beach Monitoring Project, Science Services staff members like Ron are working with others to support the DNR strategic goal of having fishable and swimmable waters throughout Wisconsin. ●



## Accessing the work of those before us...

Science Services oversees the department's Library Services Network, a comprehensive suite of information services to meet the specific needs of department staff and management statewide. The library collections and services support both resource management and environmental protection functions and are an integral part of science-based management approaches. Simply put, science builds on the foundation of research and learning of the past. Our library services provide ready access to that foundation.

Staff can take advantage of library discounts by ordering their books and videos through the library, stretching tight resources. Our librarians also obtain many materials free-of-charge from other government agencies and institutions. We circulate books, videos, audiotapes, reports, maps, and journal issues. Staff can search our online catalog, NatCat, and e-mail their requests, or they can contact the Science Services library that owns the material they want and request it.

The librarians offer reference services ranging from answers to quick questions to detailed literature searches. In addition to searching NatCat and other library catalogs, library users can access a variety of reference databases on CD and on-line (e.g., *Aquatic Sciences and Fisheries Abstracts*, *Fish and Fisheries Worldwide*, *Water Resources*

*Abstracts*, *Wildlife Worldwide*, *Dissertation Abstracts*, *Poltox [Pollution and Toxicology]*, *Agricola*, *TreeCD*, and others). Librarians also offer current awareness searches of *Current Contents: Agriculture, Biology and Environmental Sciences*. Employees determine the search criteria and journals to include in their search profile, and the library staff runs

biweekly searches and sends the results as e-mail attachments.

Each of the Science Services libraries maintains a collection of journals. Library staff route the tables of contents, either electronically or in paper copy, or in some cases the journal issues themselves, of all journals currently received. Librarians handle all the paperwork for journal subscriptions and house the journal issues in the library so that they are accessible to all staff. In the absence of this centralized service, bureaus would maintain their own subscriptions and multiple subscriptions of individual titles would likely be a common case scenario, costing the department more.

Staff can also take advantage of inter-library loan services. We contact libraries across the country and around the world using an electronic system to obtain loan copies of books, reports, and videos, and photocopies of journal articles for staff.

